

REMARKS

Reconsideration of this application, based on these following remarks, is respectfully requested.

Claims 1 through 21 remain in this case. No claim is amended.

The rejection of claims 1 through 16 under §102(e) as anticipated by, or under §103 as unpatentable over, the Bechhoefer et al. reference¹ was maintained in the Office Action of July 10, 2006, after consideration of Applicants' previous response including the Declaration under Rule 131 by Kendall Scott Wills (the "Wills Declaration"). Specifically, the Examiner found that the documentation of Exhibit A to the Wills Declaration, while showing the "theory/definition of the wavelet transforms/wavelet analysis", did not disclose the limitations of the claims.² Accordingly, the Examiner concluded that the submitted evidence did not show that the claimed invention was made prior to the effective date of the Bechhoefer et al. reference, and maintained the rejection.

Applicants respectfully traverse the rejection, and submit that the Wills Declaration shows the conception and reduction to practice of the invention as claimed. In support of this position, Applicants wish to more particularly point out the locations of Exhibit A to the Wills Declaration that correspond to the limitations of the claims.

By way of example, Applicants will begin with independent method claim 6. Claim 6 requires a first step of:

receiving a TDR signal that has reflected back up a wire from an anomaly in the wire;

¹ U.S. Patent Publication No. 2004/0230282, published November 18, 2004, on an application filed May 12, 2003 by Bechhoefer et al.

² Office Action of July 10, 2006, pages 2 and 3.

This step is shown in Exhibit A to the Wills Declaration at page 61, first paragraph, which states that “a series of TDR³ waveforms” were acquired for purposes of comparative TDR. This particular test device for which these waveforms were acquired had a failure at the interface between the solder bump and the die, but that the test device recovered from this failure after electrical stress.⁴ A next step in the method of claim 6 is:

calculating a wavelet analysis result from a wavelet analysis of the TDR signal;

This step is shown in Exhibit A to the Wills Declaration at page 61, first paragraph, by the statement that “The WT⁵ (Haar) was used on a series of TDR waveforms acquired[sic] by Omar Diaz de Leon for comparative TDR”. The wavelet transform of the time domain reflectometry generates a wavelet analysis result, which is shown for this test device on page 64 of Exhibit A of the Wills Declaration, by the two left-hand plots on that page (labeled “U3 Pre-stress” and “U3 Post-stress”; “U3” referring to the test unit). A next step in the method of claim 6 is:

accessing a library of one or more reference wavelet analysis results that each correspond to one or more known anomalies having one or more known characteristics;

An example of a library of reference wavelet analysis results is presented in Exhibit A to the Wills Declaration at page 56. This library of reference wavelet analysis results includes wavelet analysis results for a “Complete Device”, for a device with “Die Removed”, for a device with its solder “Bumps Removed”, and for a device with “Substrate Metal2 Removed”. The three anomalies of “Die Removed”, “Bumps Removed”, and “Substrate Metal2 Removed” correspond, of course, to various failure mechanisms in integrated circuits that can occur in manufacturing (e.g., “Die Removed” can correspond to a continuity failure between a solder bump and the integrated circuit die). The remaining steps in the method of claim 6 are:

comparing the wavelet analysis result with one or more reference wavelet analysis results; and

³ Time domain reflectometry.

⁴ Wills Declaration, Exhibit A, page 61.

⁵ Wavelet transform.

responsive to the wavelet analysis result corresponding to one or more particular reference wavelet analysis results, indicating that the anomaly in the wire has one or more particular known characteristics of one or more particular known anomalies corresponding to the one or more particular reference wavelet analysis results.

Exhibit A to the Wills Declaration shows such comparing and indicating, on its page 64. The calculated wavelet analysis results for test unit U3 prior to its electrical stress are shown in the upper left-hand plot on page 64. This plot was compared against the library of reference wavelet analysis results (page 56), and was found to most closely correspond to the “Die Removed” reference result on page 56, which is displayed in the upper-right hand plot of page 64 (with the time axis rescaled relative to the plot on page 56, and labeled as “Reference Package (no die)”. As such, this comparison indicates that the anomaly in the wire of test unit U3 has a characteristic corresponding to this reference wavelet analysis result, thus meeting the comparing and indicating steps of claim 6.

Accordingly, Exhibit A to the Wills Declaration clearly includes evidence showing the conception and reduction to practice of each of the steps of claim 6.

Exhibit A to the Wills Declaration clearly also shows evidence of conception and reduction to practice of the other independent claims in this application. With reference to the system for wavelet analysis of claim 1, 15, 16, and their respective dependent claims, pages 68 and 69 of Exhibit A to the Wills Declaration describe the makeup of the system that was used in connection with the results shown in the remainder of Exhibit A. As evident on those pages, the system included, as hardware, a generic personal computer and data acquisition hardware, and included software components for operating the system. Page 69 of Exhibit A also shows the various wavelet tools that were evaluated in connection with the work described in Exhibit A. Similarly, it is evident from pages 68 and 69 that Exhibit A to the Wills Declaration includes software for wavelet analysis, to which independent claim 11 and its dependent claims are directed.

Applicants therefore respectfully submit that the Wills Declaration, in combination with the Collins Declaration, establish conception and reduction to practice of the invention of claims

1 through 21 at a time prior to the effective date of the Bechhoefer et al. reference. Reconsideration of these Declarations, and withdrawal of the rejections based on the Bechhoefer et al. reference, are respectfully requested.

The provisional double patenting rejection is again noted. Applicants maintain their offer to provide the appropriate terminal disclaimer in this case, or in that copending and commonly assigned application, as appropriate for the claims now in this case or in that case, at such time as this case or that case is allowed.

For the above reasons, Applicants respectfully submit that all claims now in this case are in condition for allowance. Reconsideration of the above-referenced application is therefore respectfully requested.

Respectfully submitted,
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